|  |  |  |  |
| --- | --- | --- | --- |
| Keyword | SYNTAX | | Description |
| INSERT INTO | table VALUES val  table col VALUES  table2 (col) SELECT | | Create record in table  Copies data from one table and inserts into another  \*data types in source and target must match  \*col cannot use wildcard \* |
| SELECT | [=] \*|col FROM | | Read record  = DISTINCT, TOP, AS, Functions |
| UPDATE | table SET | | Update record  \*omit WHERE to update all records |
| DELETE | FROM | | Delete record,  \*omit WHERE to delete all records |
| FROM | table [WHERE] | | Specify which table  \*Requires table.col to reference if selecting multiple |
| DISTINCT | col | | Return unique values only |
| AS | SELECT col + name  FROM table + name | | Renames column or table with an alias  \*Requires [] or “” if alias contains spaces |
| WHERE | [NOT] cond  col OPER  val OPER val  OPER col [OPER] | | Filters record by a condition  Operators:  Comparison, Logical, IS [NOT] NULL  Logical AND, OR  Logical NOT  \*can’t be used with aggregate functions |
| ORDER BY | col [ASC|DESC] | | Sort result-set in ascending or descending order |
| SET | col = val WHERE | | Sets values, omit WHERE to set all records |
| TOP  LIMIT  FETCH FIRST  ROWNUM | n [PERCENT] col FROM  WHERE … + n  ORDER BY + n ROWS ONLY  WHERE + OPER n | | Specify number of records to return  \*MySQL only  \*Oracle 12+ only  \*Oracle <12 only |
| MIN() | (\*|col) FROM | | Returns smallest value of column |
| MAX() | (\*|col) FROM | | Returns largest value of column |
| COUNT() | (\*|col) FROM | | Returns number of rows  \*unsupported in MS Access, so use:  SELECT COUNT(\*) AS VarName FROM (SELECT DISTINCT Name FROM Database) |
| AVG() | (\*|col) | | Returns average value of numeric column  \*ignores NULL values |
| SUM() | (\*|col) | | Returns total sum of numeric column  \*ignores NULL values |
| LIKE | ‘wild’ | | Searches for specified pattern in column  \*% = zero, one, or multiple chars; \_ = one char |
| IN | (val)  (SELECT) | | Specify multiple values (shorthand for multiple ORs) |
| BETWEEN | val AND val | | Selects values within a given range |
| JOIN | FROM table1 OPER + table2…  ON table.col=table.col  FROM table1 T1, table2 T2… WHERE cond | | Combine rows from tables based on related columns  Operators:  INNER = returns records with matching values in tables  LEFT (OUTER) = all from left table + matched from right  RIGHT (OUTER) = matched from left table + all from right  FULL (OUTER) = all matched records on either side self-joins table with itself  \*CROSS in MySQL  SELF = joined with self, for matching records to each other |
| UNION |  | | Combine results of SELECT statements  \*must have same number and order of columns, plus similar data types  \*append ALL to allow duplicates |
| GROUP BY | col | | Groups rows with same values into summary rows  \*often used with aggregate functions (MIN - SUM) |
| HAVING | cond | | Used in place of WHERE with aggregate functions |
| EXISTS | (SELECT) | | Tests existence of record in subquery |
| ANY | WHERE col OPER + (SELECT) | | Tests if any subquery value meets the condition  \*OPER must be standard comparison operators |
| ALL | SELECT + FROM  WHERE col OPER + (SELECT)  HAVING cond | | Tests if all subquery values meet the condition |
| INTO | SELECT col + newtable [IN… externaldb] FROM oldtable | | Copies data from one table into new table  \*to copy only the schema, add WHERE clause 1 = 0 |
| CASE | WHEN condN THEN resN…  ELSE res END | | Switch statements |
| ISNULL()  COALESCE()  NVL()  IFNULL() | (col, alternative) | | Lets you return alternative value if expression is NULL  \*unsupported in MS Access  \*Oracle only  \*MySQL only |
| CREATE PROCEDURE | name AS sql\_statement … [@col cond] GO | | Creates a stored procedure  \*@col cond is a parameter |
| EXEC | proc [@arg] | | Executes a stored procedure |
| CREATE DATABASE | name | | Create new database  \*uses .mdb extension |
| SHOW DATABASES |  | | List all databases |
| ALTER DATABASE |  | | Modify database configurations |
| DROP DATABASE | name | | Delete existing database |
| BACKUP DATABASE | name TO DISK = ‘filepath’ | | Backs up database  \*append WITH DIFFERENTIAL to update any changes  \*uses .bak extension |
| CREATE TABLE | name (col datatype… [constraint])  name AS (SELECT col FROM) | | Create new table  Create new table from existing table |
| ALTER TABLE | name OPER [constraint] | | Modify columns in a table  Operators:  ADD, DROP COLUMN, RENAME COLUMN, ALTER COLUMN |
| DROP TABLE | name | | Delete existing table |
| TRUNCATE TABLE | name | | Delete all data in an existing table |
| ADD | col datatype | | Add new column into table |
| DROP COLUMN | col | | Delete existing column in a table |
| RENAME COLUMN | oldName to newName | | Renames existing column |
| ALTER COLUMN  MODIFY COLUMN  MODIFY | col datatype  [constraint] (col)  CONSTRAINT name… [constraint] (cols) | | Change datatype of a column  \*used for multiple column constraint  \*MySQL and Oracle <10G  \*Oracle 10G+ only |
| CREATE INDEX |  | | Create search key |
| DROP CONSTRAINT  DROP INDEX |  | | Delete search key  \*MySQL only |
| CREATE VIEW | [name] AS SELECT | | Create virtual table |
| CREATE OR REPLACE VIEW | [name] AS SELECT | | Update virtual table |
| DROP VIEW | [name] | | Delete virtual table |
| Wildcards | | Description | |
| %  \* | | Zero or more characters  \*MS Access only | |
| \_  ? | | Single character  \*MS Access only | |
| [] | | Any single character within brackets | |
| ^  ! | | Any character not in the brackets  \*MS Access only | |
| - | | Any single character within specified range in brackets | |
| # | | Single numeric character | |
| Operators | | Description | |
| +, -, \*, /, % | | Arithmetic | |
| &, | , ^ | | Bitwise | |
| +=, -=, \*=, /=, %=, &=, |\*=, ^-= | | Compound | |
| =, <, >, <=, >=, <> | | Comparison | |
| ALL, ANY, AND, BETWEEN, EXISTS, IN, LIKE, NOT, OR, SOME | | Logical | |
| Constraints | | Description | |
| NOT NULL | | Column cannot have NULL values | |
| UNIQUE | | All values are unique | |
| PRIMARY KEY | | Combines NOT NULL and UNIQUE  \*can only have one per table, use | |
| FOREIGN KEY | | Prevents link destruction between tables  Prevents invalid data from being inserted | |
| CHECK | | Satisfies a condition | |
| DEFAULT | | Set default value if none is specified | |
| AUTO\_INCREMENT | | Automatically generates unique number when new record is inserted | |

SQL = Structured Query Language, ISO/IEC 9075 + ANSI X3.135

RDBMS = Relational Database Management System, stores objects in tables

-- = single-line comment, /\* \*/ = multi-line comment

MySQL Data Types

|  |  |
| --- | --- |
| String | Description |
| CHAR(size) | Fixed length of size 0 – 255, defaults 1 |
| VARCHAR(size) | Variable length of size 0 – 65,535 |
| BINARY(size) | Like CHAR, but stores binary byte strings |
| VARBINARY(size) | Like VARCHAR, but stores binary byte strings |
| TINYTEXT | String with max length 255 chars |
| TINYBLOB | Binary Large Objects with max length 255 bytes |
| TEXT(size) | String with max length 65,535 chars |
| BLOB(size) | Binary Large Objects with max length 65,535 bytes |
| MEDIUMTEXT | String with max length 16,777,215 chars |
| MEDIUMBLOB | Binary Large Objects with max length 16,777,215 bytes |
| LONGTEXT | String with max length 4,294,967,295 chars |
| LONGBLOB | Binary Large Objects with max length 4,294,967,295 bytes |
| ENUM(valN,…) | String that can only have value from up to 65,535 listed values  If value not in list, blank value is inserted |
| SET(valN,…) | String that can have zero or more values from up to 64 listed values |
| Numbers | Description |
| BIT(size) | Bit-value of size 1 – 64, defaults 1 |
| TINYINT(size) | Integer from -128 – 127 or 0 – 255 |
| SMALLINT(size) | Integer from -32,768 – 32,767 or 0 – 65,535 |
| INT(size)  INTEGER(size) | Integer from -8,388,608 – 8,388,607 or 0 – 16,777,215 |
| MEDIUMINT(size) | Integer from -2,147,483,648 – 2,147,483,647 or 0 – 4,294,967,295 |
| BIGINT(size) | Integer from -9,223,372,036,854,775,808 – 9,223,372,036,854,775,807 or 0 – 18,446,744,073,709,551,615 |
| FLOAT(size, d) | Floating point number with size digits and d decimals  \*deprecated in MySQL 8.0.17, removed in future |
| FLOAT(p) | Floating point number where p uses FLOAT if 0 – 24, DOUBLE from 25 – 53 |
| DOUBLE(size, d) | Floating point number with size digits and d decimals |
| DOUBLE PRECISION (size, d) |  |
| DECIMAL(size, d)  DEC(size, d) | Exact fixed-point number with size digits and d decimals, where max size = 65, defaults 10, and max d = 30, defaults 0 |
| BOOL  BOOLEAN | 0 = false, nonzero = true |
| Dates and Times | Description |
| DATE | YYYY-MM-DD, from ‘1001-01-01’ to ‘9999-12-31’ |
| DATETIME(fsp) | YYYY-MM-DD hh:mm:ss, from ‘1001-01-01 00:00:00’ to ‘9999-12-31 23:59:59’  Add DEFAULT and ON UPDATE for automatic init and update to current datetime |
| TIMESTAMP(fsp) | YYYY-MM-DD hh:mm:ss, number of seconds since epoch ('1970-01-01 00:00:00' UTC), from ‘1970:01-01 00:00:00’ UTC’ to ‘2038-01-09 03:14:07’ UTC’  Add DEFAULT CURRENT\_TIMESTAMP and ON UPDATE CURRENT\_TIMESTAMP for automatic init and updating to current datetime |
| TIME(fsp) | hh:mm:ss, from ‘-838:59:59’ to ‘838:59:59’ |
| YEAR | YYYY, 1901 to 2155, and 0000; 8.0+ has no two-digit |

MySQL Functions

|  |  |  |
| --- | --- | --- |
| String | Parameters | Description |
| ASCII | Char | Return ASCII value of character |
| CHAR\_LENGTH  CHARACTER\_LENGTH | String | Return number of characters in string |
| CONCAT |  |  |
| CONCAT\_WS |  |  |
| FIELD |  |  |
| FIND\_IN\_SET |  |  |
| FORMAT |  |  |
| INSERT |  |  |
| INSTR |  |  |
| LCASE |  |  |
| LEFT |  |  |
| LENGTH |  |  |
| LOCATE |  |  |
| LOWER |  |  |
| LPAD |  |  |
| LTRIM |  |  |
| MID |  |  |
| POSITION |  |  |
| REPEAT |  |  |
| REPLACE |  |  |
| REVERSE |  |  |
| RIGHT |  |  |
| RPAD |  |  |
| RTRIM |  |  |
| SPACE |  |  |
| STRCMP |  |  |
| SUBSTR |  |  |
| SUBSTRING |  |  |
| SUBSTRING\_INDEX |  |  |
| TRIM |  |  |
| UCASE |  |  |
| UPPER |  |  |
| Numeric |  | Description |
| ABS |  |  |
| ACOS |  |  |
| ASIN |  |  |
| ATAN |  |  |
| ATAN2 |  |  |
| AVG |  |  |
| CEIL |  |  |
| CEILING |  |  |
| COS |  |  |
| COT |  |  |
| COUNT |  |  |
| DEGREES |  |  |
| DIV |  |  |
| EXP |  |  |
| FLOOR |  |  |
| GREATEST |  |  |
| LEAST |  |  |
| LN |  |  |
| LOG |  |  |
| LOG10 |  |  |
| LOG2 |  |  |
| MAX |  |  |
| MIN |  |  |
| MOD |  |  |
| PI |  |  |
| POW |  |  |
| POWER |  |  |
| RADIANS |  |  |
| RAND |  |  |
| ROUND |  |  |
| SIGN |  |  |
| SIN |  |  |
| SQRT |  |  |
| SUM |  |  |
| TAN |  |  |
| TRUNCATE |  |  |
| Date |  | Description |
| ADDDATE |  |  |
| ADDTIME |  |  |
| CURDATE |  |  |
| CURRENT\_DATE |  |  |
| CURRENT\_TIME |  |  |
| CURRENT\_TIMESTAMP |  |  |
| CURTIME |  |  |
| DATE |  |  |
| DATEDIFF |  |  |
| DATE\_ADD |  |  |
| DATE\_FORMAT |  |  |
| DATE\_SUB |  |  |
| DAY |  |  |
| DAYNAME |  |  |
| DAYOFMONTH |  |  |
| DAYOFWEEK |  |  |
| DAYOFYEAR |  |  |
| EXTRACT |  |  |
| FROM\_DAYS |  |  |
| HOUR |  |  |
| LAST\_DAY |  |  |
| LOCALTIME |  |  |
| LOCALTIMESTAMP |  |  |
| MAKEDATE |  |  |
| MAKETIME |  |  |
| MICROSECOND |  |  |
| MINUTE |  |  |
| MONTH |  |  |
| MONTHNAME |  |  |
| NOW |  |  |
| PERIOD\_ADD |  |  |
| PERIOD\_DIFF |  |  |
| QUARTER |  |  |
| SECOND |  |  |
| SEC\_TO\_TIME |  |  |
| STR\_TO\_DATE |  |  |
| SUBDATE |  |  |
| SUBTIME |  |  |
| SYSDATE |  |  |
| TIME |  |  |
| TIME\_FORMAT |  |  |
| TIME\_TO\_SEC |  |  |
| TIMEDIFF |  |  |
| TIMESTAMP |  |  |
| TO\_DAYS |  |  |
| WEEK |  |  |
| WEEKDAY |  |  |
| WEEKOFYEAR |  |  |
| YEAR |  |  |
| YEARWEEK |  |  |
| OTHERS |  | Description |
| BIN |  |  |
| BINARY |  |  |
| CASE |  |  |
| CAST |  |  |
| COALESCE |  |  |
| CONNECTION\_ID |  |  |
| CONV |  |  |
| CONVERT |  |  |
| CURRENT\_USER |  |  |
| DATABASE |  |  |
| IF |  |  |
| IFNULL |  |  |
| ISNULL |  |  |
| LAST\_INSERT\_ID |  |  |
| NULLIF |  |  |
| SESSION\_USER |  |  |
| SYSTEM\_USER |  |  |
| USER |  |  |
| VERSION |  |  |